Standard Operating Procedure for Meteorological Data Aboard the *R/V Lake Guardian*

LG300

Revision 02, February 2003

TABLE OF CONTENTS

Standard Operating Procedure for Meteorological Data Aboard the *R/V Lake Guardian*

1.0 SCOPE AND APPLICATION

1.1 This method, applicable to all surveillance cruises performed by the *R/V Lake Guardian*, was in effect during the calendar years 1994 and 1995.

1.2 These procedures are implemented while the vessel is underway and while occupying a sampling station.

2.0 SUMMARY OF METHOD

2.1 The Officer in Charge of the bridge is responsible for implementing the procedures herein described.

2.2 These following parameters are recorded in the Ship's Log:

- On the hour, vessel position, true wind speed and direction, wave height, air temperature, corrected barometric pressure, visibility, present weather conditions, magnetic/true heading and speed through water (when making way).
- The time zone difference from Greenwich Mean Time is recorded daily.
- For each significant event, the time and event description is recorded. At each sampling station the station identification, arrival and departure times, vessel position and corrected water depth is recorded.

2.3 These following parameters are recorded on the GLENDA Station Information Field Recording Form at each station visit: Visit ID, Station ID, Pilot ID (Officer in Charge) initials, arrival date and time, departure date and time, vessel position, corrected water depth and temperature, true wind speed and direction, wave height, corrected barometric pressure, visibility, present weather conditions and remarks regarding benthos findings.

2.4 Station visit data values are then entered into the GLENDA database via the Remote Data Entry Tool.

2.5 Station position, arrival time and physical data are taken upon the announcement "On Station." Drifting will occur during plankton sampling, the Officer in Charge will notify the Chief Scientist if the ship's position is greater than 0.5 nautical mile from the station at any time. The ship's position shall be reset to station location coordinates for benthos sampling.

3.0 QUALITY ASSURANCE

3.1 The Officer in Charge shall be responsible for reviewing the previous watch entries in the Ships's Log, GLENDA Station Information Field Recording Form and the GLENDA database to assure correctness of the data entered. Errors noted shall be corrected immediately.

3.2 Additional QA parameters are discussed for each apparatus in Section 4.0.

4.0 APPARATUS

4.1 Wind Speed and Direction:

4.1.1 Young Wind Monitor, digital, apparent wind angle and speed indicator (Knots).

4.1.2 Electric Speed Indicator Company, analog, apparent wind angle and speed indicator (Knots).

4.1.3 Weems & Plath True Wind calculator.

4.1.4 The ship's true heading and speed value are marked on the Weems & Plath true wind calculator. The true direction of apparent wind is then determined by applying ship's heading to the apparent wind angle. The true direction of apparent wind angle and speed value is marked on the true wind calculator. The true wind calculator is then slewed in the same direction taken on second step until the marks are parallel with the centerline of the calculator. True wind speed is determined by distance on the grid of the true wind calculator. True wind direction is read at the top of the calculator.

4.1.5 Instrument accuracy, ± 1.5 degree wind direction and ± 2.0 knots wind speed, is assured by factory calibration records and by comparison.

4.2 Barometric Pressure:

4.2.1 Belfort Instrument Company, recording barograph (mB).

4.2.2 Chelsea Boston, aneroid barometer (In and mB).

4.2.3 R.M. Young, Model 61201 barometric pressure sensor (mB).

4.2.4 All barometric pressure devices aboard the *R/V Lake Guardian* are calibrated for sea level. Corrections are applied based upon altitude of the current lake. The correction factors are:

Lake Superior	+.67 In	+23.11 mB
Lake Michigan/Huron	+.65 In	+22.27 mB
Lake Erie	+.64 In	+21.97 mB
Lake Ontario	+.29 In	+10.19 mB

4.2.5 Instruments are calibrated annually based on local airport reference. Accuracy, ± 2.0 mB, is assured by factory calibration records and by comparison.

4.3 Air Temperature:

4.3.1 RMS Technology Inc., digital thermometer (Fahreheit).

4.3.2 R.M. Young, Model 41342VC/VF platinum temperature probe (Celsuis).

4.3.3 Instrument accuracy, ± 0.3 degrees Celsius, is assured by factory calibration records and by comparison.

4.4 Sea Depth:

4.4.1 Furuno, Model FCV-292, Dual Frequency 50/200 khz, color video sounder.

4.4.2 Furuno, Model FE-881 MkII, 200 khz, echo sounder.

4.4.3 All depth sounding devices aboard the *R/V Lake Guardian* bridge are calibrated for salt water. Corrections are applied based upon the density/sound velocity radio of .973. The ship's average forward draft of 10 feet or 3 meters is then added to the corrected sounding for sea depth.

4.4.4 Instrument accuracy, ± 5%, is assured by comparison to the SeaBird 911 data and charted soundings.

4.5 Sea Temperature:

4.5.1 Furuno, Model T-02MSB bronze thru-hull temperature sensor coupled to the Furuno FCV-292.

4.5.2 Instrument accuracy, ± 0.5 degrees Celsuis, is assured by comparison to SeaBird 911 data.

4.6 Ship's Heading:

4.6.1 Sperry, Model Mk-27 Mod0, gyro compass.

4.6.2 Ritche, 7 ½ inches, magnetic compass.

4.6.3 Instrument accuracy, ± 1.5 degrees, is assured during river transits by range markers and underway by comparison to GPS generated course over ground.

4.7 Ship's Water Speed:

4.7.1 JRC, Model JLN-203, doppler speed log.

4.7.2 Instrument is calibrated when needed.

4.7.3 Accuracy, ± 0.5 knot, is assured by running measured miles during river transit and underway by comparison to GPS generated speed over ground.

4.8 Ship's Position:

4.8.1 Trimble, Model NT200D, differential global positioning system receiver.

4.8.2 Furuno, Model GP-500, global positioning system receiver.

4.8.3 Instrument accuracy, ± 10 feet, is assured by satellite health messages and visual dockside position comparison.